



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

## DESCRIPTIONS OF NEW TINEOIDEA.

BY W. D. KEARFOTT.

The majority of the following species are the result of breeding from larvæ found on various food plants in New Jersey.

I am indebted to Mr. August Busck for very kindly working up the genera of most of the species, in fact more than half of the species are described on his authority that they were unknown. I have also to acknowledge my obligation to Mr. C. L. Pollard for all the botanical determinations, excepting the conifera, also to Dr. W. H. Ashmead for all identifications of the hymenopterous parasites, and my thanks are especially due to Mrs. William Beutenmüller, for the very artistic and perfectly drawn figures for the plate that accompanies this paper; and it is with much pleasure that I can add my small testimony to the generally conceded opinion, that Mrs. Beutenmüller is the first in the ranks of the entomological artists of this country.

***Symphysa adelalis*, sp. nov.** Plate IX, Figs. 11 and 20.

Head and thorax pure white, eyes black. Tongue short, yellow. Palpi short, porrect, second joint with long loose projecting scales beneath, apical joint short, not pointed; color white, shaded with pale golden-brown. Antennæ one third length of forewing, ciliated; basal joint white, enlarged, outer joints white, with annular rings of pale brown on each, darker on the inside. Forewing pure white, a few pale brown scales on median line at base, an interrupted band of the same from costa to inner margin, before middle, the scales within this band on the inner margin are very long and tipped with dark brown. An ovate discal spot of dark brown raised scales. A sub-outer marginal band of very pale brown from costa before apex to inner angle, broadening below and extending up to discal spot and below cell almost to and sometimes coalescing with inner band. A few raised yellowish scales, tipped with brown on costa just before apex, in some specimens this is a well-defined spot, in strongly marked specimens there are three small brown dots on outer margin, just below apex. Cilia a pale brown inner band, then a nearly white band, scales tipped with dark brown at apex, becoming paler below. The markings are repeated on the underside, but intensified, and concentrated into two patches of dark brown, one before the discal spot and one subapical. Hindwing pure white, with two shades or patches of light brown on the inner margin, the inner about middle of margin extends upward to cell, the outer beginning at anal angle reaches to within a quarter or a third of apex, nearly parallel to outer margin, in the darkest specimens these shades almost or quite coalesce at their upper parts. There are two tufts of very long raised white scales, tipped with brown, one on median line beginning at base and ending over inner brown shade where the brown tips form a distinctly darker spot, the lower one extends from inner angle to about inner third of dorsum, and the brown tips form another spot at

that point. In repose, especially when the wings are below the abdomen, so that the dorsum is in profile these two tufts and the long thoracic scales form a dentate outline of three prominent groups of scales. (The thoracic tuft white, the two dorsal tufts dark brown.) Cilia: white shaded with light brown lines, darkest opposite the dorsal patch. Underside: the pattern of the upperside is more or less faintly repeated, some specimens have three small dark brown dots, one about middle of cell, one on same line half way between end of cell and outer margin and the third close to the anal angle. Abdomen: first abdominal segment pure white, second shaded with brown, others to apex dark brown, with white scales at incisions. Underside white, slightly shaded with brown. Legs white, outer joints lightly shaded with brown. Alar expanse 12 to 16 mm.

Described from 46 specimens, issued from July to 20 August 15. Types U. S. Nat. Mus., no. 6970. Cotypes, Am. Mus. Nat. His., Acad. Nat. Science, British Museum and collection Kearfott.

*Larva*. — Full grown, 8 mm., extended 10.5 mm., flattened, annulated. Width segments 4 to 11, 1.9 mm.; width head 1.1 mm. broad, flattened, triangular, retractile into 2 and 3; head very dark brown, almost black, shining, mouth parts paler, almost square deeply cleft on top forming two well rounded lobes, shagrened; clypeus triangular, curving out slightly just above base, suture light brown. Antennæ long, pale at base, two outer segments black, joints paler, ocelli brown on darker brown field. Segments 2, contracted, smoky brown. Prothoracic shield divided from head by pale cream color collar, narrow, but extending down almost to spiracles, color brown clouded with paler shades and edged posteriorly and laterally with black. Anal shield small, concolorous, roughened but not chitinous. Thoracic feet unusually long, claws dark brown, upper segments pale brown. Four pairs abdominal feet but slightly developed, the crochets brown, small, circle slightly flattened or oval and not open, color brown. Anal feet the same. Spiracles concolorous. Dorsal setæ very short and minute, lateral setæ moderate, head setæ long, nearly equal to width of head. Tubercular plates large and polished, giving larva a shining appearance, the dorsal tubercles on 3 and 4 are like prothoracic shield, chitinous, smoky brown.

*Pupa*. — Very small for size of moth; 6 mm. long, 1.6 mm. diameter at thorax, rounded and tapering gradually to anal end which terminates in two very short knobs on the cremaster, each armed with a single short recurved hair. Eye caps prominent, oblong, reaching to vertex of head, clypeal space between eyes rather narrow and nearly closed just above labrum; labial palpi narrow, tapering to a point at their posterior end which is two thirds distance from vertex of head to end of wing cases; latter and thoracic feet cover sixth abdominal segment; antennal cases terminate half way between tips of wing cases and end of labial palpi. No spines or hooks on dorsal region. Setæ minute. Dehiscence: upper half of labial palpi separates on both sides thoracic feet cases, and remains attached to labrum, clypeus and eye caps. Another long separation occurs on each side between antennal cases and wing covers, also a split along dorsal line which extends to posterior edge of thorax.

About the latter part of June, 1901, when examining the tree trunks at Anglesea, N. J., for small moths, I found a very interesting larval case a little more than an eighth of an inch long roughly shaped like a flat-

tened figure 8 but rounded out instead of indented in the waist and which was made of very small particles of a nearly pure white lichen (Plate IX, Fig. 20, enlarged); this lichen occurring in patches on several species of trees in this sea- and wind-swept district, including oak, holly and juniper. I felt very certain I had discovered the habitat of one of our North American species of *Adela*, as the case very closely resembles the cases of that genus as figured in Stainton's Natural History of the Tineina, Vol. XIII.

Notwithstanding that an ample supply of the lichen was brought home with it, the larva failed to get beyond the stage in which I found it, although constantly watched until the spring of the following year. When, in 1902 I visited Anglesea again, at nearly the end of June, and began almost immediately on arrival a hunt to secure other cases of my supposed *Adela*, sp. The trees were there and the patches of lichen were common and for over two hours I scrutinized minutely and as I thought exhaustively, with never a case to reward my search; almost on the point of giving up the hunt I threw myself down on the soft white sand at the root of a large oak, and from force of habit kept my eyes on the white lichen although it was seemingly barren of insect life; after a few moments steadily gazing at one spot I fancied I witnessed a slight movement, still closer examination and the secret was out — a full-grown case this time, with the larva busily eating, and occasionally as he browsed, shifting his case a short distance and then securing it again with a few threads of silk. In five minutes on this same patch I had found eight more cases and in an hour or two ten times as many.

The home of this larva is a very beautiful illustration of natural mimicry, as it is composed of the pabulum of the insect, without change of color and almost without change of form, flattened and with edges pressed tightly to the lichenous bark, it is as nearly invisible as anything in perfectly plain sight can be, and I am afraid had not my first larva taken the notion, at the moment I was looking towards him, to move his house, he would be undiscovered to this day. A fresh supply of food was brought back to the city with the cases, and placed in a very large battery jar with the pieces of bark secured to short thin boards and all stood on end in the jar, to imitate the natural position of the bark; an occasional sprinkling with a fine hot-house syringe and the cover left off of jar to ensure plenty of fresh air seemed to agree with the larvæ as the increasing quantity of dry

powdery frass at the bottom testified. A month later several very delicate little pearly white moths made their appearance, and destroyed my hope of an *Adela*, but as the habitat of this larva so closely resembles that of an *Adela* larva, I have called it *Adelalis*, although to be properly scientific I suppose it should be called in Latin the "Lichen-feeding-*Adela*-like-case-bearing-almost-invisible-pyralid."

It is placed tentatively in the genus *Symphysa*, as its structure more nearly resembles the species of this genus than any other with which I am familiar, but there are certain differences in the moth as well as entirely different habits of the larvæ which will probably warrant the erection of a new genus if nothing more closely allied than *Symphysa* can be found to accommodate it. The case is from 14 to 16 mm. long, 6 to 7 mm. wide, 2.5 mm. thick in the middle. It is composed of small particles of nearly white lichen, held together with silk, the outside appearance is rough very much resembling the lichen on a fairly smooth piece of bark; the inside is neatly lined with a thin layer of white silk.

The case is bivalvular, the under valve is only two thirds the length of the upper, hence, at each end the latter overlaps the former, giving a space for the larva to stretch head and two or three segments from the closed case and feed in safety, entirely invisible, under the protection afforded by the projecting ends of the upper valve; this item of safety is further enhanced by the way the silk is spun into these ends, causing them to lay with edges flat and pressed to the bark.

The case is begun with a hinge on one side, exactly like a pair of clam shells, and is enlarged by adding to the outer edges and ends. On the under side the concentric rings of slightly different shades of lichen clearly indicate this. In shape the main or protected part of case is roughly oval, but with the extension pieces of the upper valve broadening out equal to its greatest width. Fig. 20 on Plate IX was drawn from an imperfect case, in perfect specimens the outer ends are smoothly and evenly rounded.

The larvæ spend from eight to ten days in pupa. On June 26 about a dozen moths had emerged, while a considerable number of larvæ had not pupated. Only one brood, the moths, no doubt, lay their eggs shortly after emergence, and I believe the eggs hatch and small cases are begun in the fall, the insects wintering in this stage.

**Crambus vachellellus**, sp. nov. Plate IX, Fig. 6.

Head, palpi and thorax lead color with a slight metallic luster. Fore wing dull lead color, inner two thirds, with a number of nearly black lines; one, beginning at base extends parallel to costa to inner third where it divides for a short distance (about one eighth), then joining again and ending before subterminal band. A second line begins at costa on inner third, runs obliquely outward to band number one but does not touch it, beyond this on costa a third oblique dash. Below band number one beginning at base a fourth band descends obliquely towards anal angle, but stopping before subterminal band, below this band number five runs parallel to number four, number six, somewhat less distinctly defined parallels the last two. In the space beyond and below cell and between bands one and four are three short dashes of same dark color. Between these dashes and also between bands four and five the ground color is replaced by creamy white. The ground color of outer third of wing is bright ochreous, crossed from costa to anal angle by subterminal band of metallic lead color. This is angulated in center same as *hortellus*. An apical dash of metallic and metallic scales on cilia forming a terminal metallic band is also like *hortellus*. The three black dots on lower half of outer margin are also repeated. Hind wings and under side of both wings are dull lead color, cilia shining but not metallic. Abdomen lead color, legs fuscous. Alar expanse 15 to 20 mm.

Size and markings same as *Crambus hortellus* Hbn. but ground color very dark lead grey, instead of pale cinereous as in our eastern specimens of *hortellus*, and while it may prove to be the same species, the constancy of coloration in the long series before me will certainly entitle it to a varietal name.

My species much more closely resembles Meyrick's description of *hortellus* in his Handbook of British Lepidoptera than Fernald's description of this species in his Crambidae of North America.

Described from forty specimens collected by Arthur H. Vachell, Verdi, Nevada, June 1 to 10, 1903, and I take pleasure in naming it after him. Mr. Vachell advises me that the specimens were all caught in long grass.

Type U. S. Nat. Mus., No. 6969. Cotypes, Am. Mus. Nat. Hist., Acad. Nat. Sciences, British Museum and collection Kearfott.

**Thaumatopsis daeckeellus**, sp. nov. Plate IX, Fig. 14.

Eyes large, hemispherical, reddish-brown mottled with black, scales between eyes, long, erect, light and dark brown mottled, same coloration extending over thorax, base of antennæ circled by a ring of cream-colored scales. Palpi long as head and thorax, pointed; long scales mottled ochreous fuscous and dark brown. Antennæ half as long as front wing, pectinated, dark fuscous. Front wing ochreous fuscous, almost uniformly distributed over wing, except above median line ground color is a shade or two darker. Conspicuously marked with a narrow white band on median line beginning at base, clearly defined and distinct to end of cell, then gradually turn-

ing to light brown (approximating ground color of wing) and continuing to outer margin. No other lines or dashes. Cilia short, uniform with ground color. Hind wing dark fuscous. Underside both wings dark fuscous. Abdomen dark fuscous; terminal tuft shade lighter. Legs dark fuscous. Alar expanse 20 to 23 mm.

Described from five males, Lucaston, N. J., October 10, 1902. Collected by E. Daecke in whose honor I take pleasure in naming this very distinctive species. Mr. Daecke states that on October 10 the grass was fairly alive with specimens of this species, and as it seemed so common he thought the few he caught would be sufficient for all of his needs.

**Zelleria celastrusella**, sp. nov. Plate IX, Fig. 1.

Head : frontal tuft of long, overhanging, light gray scales, finely speckled with brown, and over the eyes forming rounded tufts, out of which the antennæ arise. Palpi porrect, one and a half length of head, second and apical joint about equal in length, both tufted, the apical joint ending in a large rounded tuft, scales same color as on head. Eyes black. Antennæ : basal joint slightly thickened beneath, color fuscous, more whitish on upper side of basal joints, and at incisions, length three quarters of forewing. Thorax : rather closely appressed scales, whitish with fuscous spots caused by tips of scales being so marked. Patagia long, appressed scales, same color as thorax. Forewing : fuscous, with loosely appressed scales, about twenty single long, black scales form as many black dots, four on costa before the middle, two just below costa beyond the middle and two on costa before the apex, others are about evenly distributed over the dorsal half of wing, a lighter shade crosses wing at inner fourth bordered outwardly by a much darker patch, which is broadest just below costa, and curves inwardly to a narrow band on dorsum. A distinct patch of white scales form a spot on costa before apex, just at the beginning of the cilia, another patch of white scales on outer margin between apex and outer angle, between these white patches is a median shade of yellowish fuscous, beyond this shade and the white spots the cilia is inwardly margined with black, cilia before apex ferruginous, a shade of pearly white scales on cilia below lower white spot. A streak of lighter ground color from base to angle between median and dorsal. Underside dark fuscous, nearly black at apex. A costal white line on the outer half, ending in a white costal spot beneath the subapical spot on upper side. Cilia paler. A long pencil of dark fuscous hairs arise at base and lay along costa. Hind wing : upper and under side uniformly dark fuscous, cilia paler. Abdomen fuscous, speckled with lighter scales. Legs same as head and palpi. Alar expanse 13 to 16 mm.

Described from about 200 bred specimens, Essex County, New Jersey, larvæ on *Celastrus scandens* Linn. (climbing bittersweet). Type U. S. Nat. Mus., no. 6817. Cotypes, Am. Mus. Nat. Hist., Acad. Nat. Sciences, British Museum and collection Kearfott.

*Larva*.—Mature, 9-10 mm. long, slender, tapering evenly to each end, slightly annulate, width widest part middle segments 1.5 mm.; width head .45 mm. Head olive greenish-brown, mouth parts light brown, ocelli black; slightly flattened, in-

dented at top, lobes full and rounded. Clypeus triangular, reaching only half way to vertex. Thoracic legs yellowish-green; abdominal legs normal, complete crochets of brown hooks. Skin vivid leaf green, slightly darker dorsal line and ventral surface paler. Anal prolegs long, projecting back beyond anus. No lines or marks on skin. Thoracic shield concolorous, but shining, tubercular plates concolorous and inconspicuous. Spiracles minute, concolorous. Tubercle i at same height as ii, iii directly dorsad to spiracle, iv caudad and ventrad to spiracle. Thorax ia + ib, iia + iib. Setæ short and very slender, tubercles minute.

*Pupa*.—From empty pupal skin; very thin and flimsy. Length 5.5 mm. Wing and antennal cases extend down to extreme end of anal segment, the latter a trifle beyond as two blunt points. Cremaster small, very slightly indented, armed with two short hairs, each terminating in a small recurved hook. Labial palpi about half length of wing cases and swelling out to twice its average width, at about one third below labrum. Just below eye cap, on each side between labial palpi and prothoracic feet cases, is a slightly indented oblique suture forming a small triangular space that perhaps indicates the position of the maxillary palpi. Dehiscence, the ventral edge of antennal cases on one side separate from prothoracic foot, and on the other side the lateral edge of antennal case separated from wing case for about half their length. Part of vertex of head, clypeus, labrum and about half of eye-caps remain cemented to labial palpi.

Early in May the terminal twigs and almost every leaf of this vine is crumpled and spun together by these slender green larvæ, each living separately. Pupated from May 15 to 20 and moths began emerging May 27, continuing until middle of June. I have not found any trace of a second brood. The larvæ pupate within the crumpled leaf, spinning a dense spider-web mass of white, silk, pupa remains in cocoon when moth emerges. The moths have a distinctive resting habit; the legs are drawn up close to thorax and latter is pressed down so that the ventral side touches the twig, the wings are pressed tightly against abdomen and tilted up, at an angle of fifteen to twenty degrees from the level of the surface on which they are resting. In this position they can readily be mistaken for a well-developed bud, as their general color is not unlike the bark of the vine.

### Recurvaria.

During the early spring of 1902 and 1903 I succeeded in breeding moths of this genus from four different species of conifera, and after having done so found I was able to clear up a case of wrong identification with regard to one of the species.

In the Fifth Report of the U. S. Entomological Commission, page 850, Fig. 284 is labelled *Gelechia obliquistrigella* Cham. The type of *obliquistrigella* which Mr. Busck has examined at Cambridge and the



U. S. National Museum is an entirely different species. Therefore, Fig. 284 represents a species until now undescribed and which I propose to call *piceaella* after its food plant, red spruce in New England and black spruce in Northern New Jersey.

Very closely allied to this species, and difficult to separate in the perfect state, except for its average smaller size is a species that feeds on *Thuja occidentalis* Linn. (arbor-vitæ or white cedar), this species I have named *thujaella*.

On *Juniperus virginiana* Linn. (red cedar) I have bred what I believe to be the true *obliquistrigella* of Chambers.

On *Juniperus communis* Linn. (common juniper) is a fourth species closely allied to the last, which I have named *juniperella*.

Two additional species were also bred on conifera which, having similar larval habits, may be included in the following brief synopses.

On *Pinus rigida* Mill. (common pitch pine) the larvæ of *Paralechia pinifoliella* Cham. are common throughout northern New Jersey.

On account of its larval habits I am inclined to place this species under the genus *Recurvaria*, but refrain owing to a strong protest from my friend Busck whose opinion on the general subject and especially generic distinctions I have much respect for; although I am not convinced that he is entirely right in placing *pinifoliella* — a miner of pine needles and our old friend *inscripta* Wlsm. (but hereafter to be known as *cristifasciella* Cham.), whose larva lives on oak, between two leaves fastened together with silk, both together in his new genus *Paralechia*; and while the venation of these two species may be identical, their appearance, in outline, coloration and general superficial characters, as well as their habits, are very different.

On *Tsuga canadensis* Linn. (common hemlock), *Recurvaria apicitripunctella* Clem. (*abietisella* Pack.) are common as larvæ in March and April in North Jersey.

The five first-named species are distinctly miners, excavating and living within the leaflets or needles; I was somewhat doubtful about this being the case with the two juniper species, as juniper leaflets are very much contracted at the joints, but careful examination with a lens proved that narrowed as they are they are hollowed out in exactly the same fashion as by the feeders on the long leaf pine and shorter leaf spruce.

The leaf of the hemlock is so very flat it is very doubtful if the larvæ excavate, at least in their later stages.

I have observed one habit common to all six species. Their eggs are laid within a reasonable time after the moths' emergence (June and July), in due course the young larvæ hatch and begin a very minute mine (the hemlock species I have not observed in its earliest stage), which is slowly enlarged until cold weather causes torpidity, and the larvæ remain in these original mines until the earliest sunny and warm spring days, when they desert the old mines and begin new ones (in previous season's leaves) usually farther out or nearer the end of the twig. One pitch pine needle is sufficient to complete the larva's growth; on spruce several are required and the holes in the bases of these are connected together with slender tubes of silk, the larva passing from one to another at will, and it may often be seen in the tube, between two needles, seemingly enjoying the warmth of a sunny day.

The above-named moths can be separated by the following synopsis.

#### SYNOPSIS OF SPECIES.

1. Forewing with whitish band from base to outer margin, parallel to costa..... 2  
Forewings without this band..... 3
2. Subcostal band on forewing continuous..... **juniperella**.  
This band interrupted about one third from apex..... **obliquistrigella**.
3. Forewing with three oblique costal dashes..... 4  
Forewing without these dashes..... 5
4. Forewing grayish fuscous..... **thujaella**.  
Forewing ochreous fuscous..... **piceaella**.
5. Forewing with three white vertical bands from costa to dorsum..... **pinifoliella**.  
Forewings amber color, an oblique white streak from middle of costa.  
**apictripunctella**.

The following synopsis will indicate the principal differences in the larvæ; the most similar pair of moths *thujaella* and *piceaella* are very distinct in the larvæ. All comparisons are from mature larvæ.

#### SYNOPSIS OF LARVÆ.

1. Head and prothoracic shield very dark brown, almost black..... 2  
Head and shield light brown..... 3
2. Skin green..... **apictripunctella**.  
Skin brown..... **pinifoliella**.  
Skin red..... **thujaella**.
3. An open red square on abdominal segments confined to dorsal region  
**obliquistrigella**.  
These squares extending to below spiracles..... **juniperella**.  
Red predominating on dorsal and lateral regions..... **piceaella**.

**Recurvaria thujaella**, sp. nov. Plate IX, Figs. 8 and 21.

Head cream white, closely appressed scales. Palpi long, twice length of head, descending, curved; cream white, basal joint black, and a black streak on under side of middle joint from base to half its length; a narrow ring of black on terminal joint near base and another just before apex. Antennæ: length two thirds of forewing; basal joint dark brown, without pecten, balance grayish-white with black annulations at incisions. Thorax and patagia cream white. Forewing cream white; three outwardly oblique, roughly triangular, black costal patches, all edged outwardly with whitish scales; the inner begins at base and extends nearly to dorsum, the middle patch at inner third and the outer at outer third are both smaller and reach only to median line; with a denser cluster of black raised scales at lower apex of each forming a distinct black dot; below each, close to dorsum is a small black dot; close to costa between basal and middle patch is a sixth black dot, these six dots are in three vertical pairs, almost evenly spaced and are all formed of black raised scales bordered by one or two pure white scales. The outer patch is bordered by a white line from costa, curving obliquely outward to middle of wing and then obliquely inward to dorsum. Beyond this white line on costa is a patch of ground color more or less evenly overlaid with dark brown scales, beyond this on outer margin is a wide band of blackish-brown and a paler streak at extreme outer edge. On costa before apex are three small black dots, also one at apex, one on outer margin close to apex and one close to outer angle, these six spots are of black raised scales with one or two white scales bordering each; the apical spot is narrowly ringed with ground color, this ring is bordered by darker scales, these scales being condensed into a fine semicircular line on extreme apical margin, the whole forming a clearly defined apical ocellus. Cilia above apex, short, ground color heavily overlaid with black, below apex longer and less overlaid with black, on inner margin light gray and as long as width of wing. Cilia indented at inner angle. Under side smoky gray, a pale whitish narrow shade along costa at outer third and several lighter shades on costa before apex. Cilia much paler, especially along outer margin where it sharply contrasts with dark gray of wing; this lighter shade turns the corner of the apex. Hind wing light gray; cilia same, about one and a quarter as long as width of wing. Under side same, but slightly darker. Abdomen creamy white, under side shaded with brown at anterior and middle segments. Legs creamy white, each joint ringed or shaded with dark brown. Alar expanse 8.5 to 10 mm.

Described from forty-two specimens, bred from *Thuja occidentalis*, Linn., the common arbor-vitæ used extensively for hedges, and also known as white cedar when allowed to grow into trees.

Type U. S. Nat. Mus., No. 6964. Cotypes, Am. Mus. Nat. Hist., Acad. Nat. Sci., British Museum and collection Kearfott.

*Larva*. — Slender cylindrical, tapering only close to ends, slightly annulate, length 7.5 mm. Width central segments, 1 mm. Width head .5 mm. Head jet black, narrow pointed, scarcely indented at apex, lobes rounded, clypeus narrow, triangular, reaching to within one third of vertex. Prothoracic shield dark brown nearly black bisected by a faint green line and separated from head by a narrow green collar. Anal shield small, black. Thoracic feet black-brown; abdominal feet

normal, hooks brown in small complete crochets. Skin dull red, slightly tinged with purple, greenish in incisions between segments pink on ventral surface.

*Pupa*.—From empty pupal shell. Length 4.5 mm., slender, cylindrical, tapering evenly to anal end, which is rounded, not pointed, and armed with two short recurved hairs. Wings and antennæ extend down to posterior edge of fifth abdominal segment. Labial palpi slender, tapering evenly to almost a point and half as long as wings. Vertex of head rounded and smooth, eyes rounded, moderate, prominent. Dehiscence accomplished by labial palpi, to which is attached labrum, clypeus, and eye caps, separating from prothoracic feet covers, on one side the split extends down to lower end of palpi. On dorsal line the split extends length of thorax. Pupa remains in cocoon when moth emerges.

The eggs are deposited in the summer, and young larvæ begin mining in the preceding year's leaves, avoiding the tender and resinous young leaves of the present year; they are probably more than half grown by fall and hibernate in this stage. In the very early spring, late February and early March, on warm sunny days the larvæ can be seen travelling a few inches farther out the twig and starting a fresh mine, this time in the growth that was new their first year.

The interior of the peculiar close-jointed leaves, is completely excavated, causing the empty leaves to turn yellow, and these small patches are easily seen as contrasted with the natural dark green foliage (Plate IX, Fig. 21, enlarged). When ready to pupate the larva lines one of the leaflets with white silk, making a roomy little cell and begins pupating latter part of May, first moths emerged June 7, and continue during June.

A few hymenopterous parasites were bred, issuing about the same time as the moths, which Dr. Ashmead describes as new in this number of the Journal (p. 144) under the name of *Protopanteles recurvariae* Ashm.

### **Recurvaria piceaella**, sp. nov. Plate IX, Figs. 10 and 19.

Markings same as *thujaella*, except the light shades have an ochreous tone rather than fuscous as in *thujaella*. The average size of *piceaella* is about 1 mm. greater than of *piceaella*. Otherwise, the two species are very difficult to separate in the imago state, and my only justification in making two species is in the considerable difference in the larvæ and their food plants. Alar expanse, 9.5 to 11.5 mm.

Described from fourteen specimens bred from black spruce, *Picea mariana* Mill., Montclair, N. J. Issued May 30 to June 18, 1903. Type, U. S. Nat. Mus., No. 6962. Cotypes Am. Mus. Nat. Hist., and collection Kearfott.

*Larva*.—Same shape as larva of *thujaella*, but instead of black the head is pale brown, prothoracic shield same but lighter. Skin red on dorsal, lateral and ventral

regions, a dark green patch on each abdominal segment, on central dorsal area. On ventral surface of thoracic segments, between each pair of legs is a deep purplish red spot; on segments 5 and 6 there is one such spot on each segment on center line.

This species is so well represented by Fig. 284, page 850 of the Fifth Report of the United States Entomological Commission, that a detailed description is hardly necessary. Dr. Packard states that the alar expanse of the specimens before him was 13 mm. I have not bred or seen any specimens exceeding 11.5 mm.

Parasites: *Protopanteles recurvariae* Ashm., same as above.

From the same batch of larvæ from which the above issued were bred three almost black specimens which, below, I have given the varietal name of *nigra*.

***Recurvaria piceaella* var *nigra*, var. nov.** Plate IX, Fig. 9.

Face cream white, slightly irrorated with smoky brown, scales closely appressed, vertex same but smoky brown predominates. Palpi long, curved upwards, outer end of second joint enlarged, apical joint about half as long as second, obtusely pointed. Color inside and top of second joint cream white, underside fuscous, irrorated with black, outside dark brown, nearly black, with two small spots of creamy white on inner end and a large white spot at outer end. Outer joint a white annulation at base, center and apex, between these are two rings of blackish-brown. Antennæ: basal joint black, slightly enlarged, about three fifths length of front wing, annulated with cream white and fuscous. Thorax shiny fuscous, irrorated with brown scales. Fore wing: color dark brown, nearly black on costa, evenly shading to a few degrees lighter on dorsum. Marked by three conspicuous oblique white costal spots, evenly spaced, first at inner fourth, second about center and outer at apical third. A black spot close to costa beyond first white spot and two black spots below it, one on median line and one close to dorsum, both outwardly edged with white. Below middle white costal spot is a smaller white spot on median line, below this but slightly towards base is another black spot edged outwardly with white. A larger black spot close to dorsum at outer two thirds, edged with white costad, and a smaller black spot just above it, this latter has a white scale on each side dorsad. The outer white costal spot extends obliquely to median line, then proceeds at right angles inwardly to dorsum, forming a >, beyond this the ground color is dark fuscous, heavily overlaid with black scales, and with three small median spots of white in a line parallel to costa before apex, and one just above anal angle on outer margin. Cilia dark fuscous, inside light fuscous. Hind wing very dark fuscous, cilia paler, underside of both wings same. Abdomen dark fuscous, anal tuft dark cream. Legs fuscous, annulated with cream color. Alar expanse 10 mm.

Three specimens bred from *picea mariana* Mill. Type U. S. Nat. Mus., No. 6963. Cotypes Am. Mus. Nat. Hist. and collection Keffott.

**Recurvaria juniperella**, sp. nov. Plate IX, Figs. 3 and 17.

Head creamy ochreous white, closely appressed scales. Palpi long, second joint thickened with appressed scales, third joint nearly as long as second, slender, bluntly pointed, slightly drooping, curved outward and upward; color cream white, with dark brown or blackish scales on basal joint, on under side and extending upwards in two patches on outer side of middle joint, forming basal ring and a short streak on under side of terminal joint, this last streak joining a subapical ring. Antennæ: basal joint without pecten, whitish clouded with brown, other joints with annulations of white and brown, about two thirds length of forewing. Thorax creamy white, less ochreous than head, irrorated with light brown. Forewing: creamy white, a sharply defined narrow band of black raised scales slightly and evenly curved from base along median line to apex of wing, at base this black band extends to costa to one eighth; above this band the ground color is more of a pearly white, and forms a distinct whitish streak; on costa at inner third is a short line of black and at outer third a longer line of black, the latter broadening at outer end into a triangular patch almost reaching median band. Four almost evenly spaced dots of black raised scales parallel to and about midway between median bands and inner margin, a fifth dot vertically above the outer on the costal edge of the median band. Three other dots in a line along outer margin; all of the dots are of black raised scales bordered by one or two white scales. Cilia at apex and outer margin mottled with dark brown, at inner margin pale gray. Under side brownish-gray, darker along costa and at apex. Hindwing: upper and under sides pale gray. Abdomen creamy white, darker beneath. Legs creamy white, streaked and spotted with reddish-black, the latter color predominating on first pair, only the incisions are white. Alar expanse 9.5 mm.

Thirteen bred specimens on *Juniperus communis* Linn., Essex Co., N. J.

Type U. S. Nat. Mus., No. 6965. Cotypes, Am. Mus. Nat. Hist., and collection Kearfott.

*Larva*.—Slender, cylindrical, slightly and evenly tapering to each end, 5-6 mm. long, 9 mm. extended. Width widest part 1.3 mm. Width head .55 mm. Head high or long, slightly flattened on face, slightly bilobed at top, lobes small and rather acutely rounded. Clypeus triangular, to within one third of vertex, narrow. Color, head light brown, mouth parts darker, ocelli black, antennæ very short. Prothoracic shield concolorous with head, size moderate, to subdorsal line. Thoracic legs light greenish-brown, abdominal legs normal, hooks yellow in complete crochets. Skin pale dull green, tinged with dull pink laterally on dorsum and on posterior edges each segment, and a double pink line across the anterior edge of each abdominal segment. The pink shading is concentrated into oblique dashes behind and below the spiracles. Ventral surface paler green. Tubercular plates inconspicuous, setæ weak and short.

*Pupa*.—From empty pupal skins. Length 3.8 mm. Slender, slightly flattened tapering evenly to end of anal segment, which is rounded smoothly with no trace of a cremaster, armed with a dozen or more very short fine hairs, with small recurved hooks on their tip ends, on dorsal and ventral surfaces, principally on former; later-

ally on each abdominal segment is a minute spur and minute stiff hair, to assist pupa to make its way to hole prepared for emergence of moth. Wing cases half way overlap sixth abdominal segment, labial palpi, half length of wing covers, are slender, very slightly enlarged at one third. I do not recognize any indentation or marks indicating maxillary palpi. Dehiscence: labial palpi separated on both sides for its entire length except lower end, from the prothoracic feet, the antennal cases are laid between the metathoracic feet and wing covers. To the labial palpi are attached the labrum, clypeus, a small part of the vertex of head and inner half of eye cap. Apparently segments six and seven are free.

A new hymenopterous parasite was bred from this species, described in this number of the Journal (p. 144) as *Orgilus kearfotti* Ashm.

**Gnorimoschema busckiiella**, sp. nov. Plate IX, Figs. 7 and 8.

Head: cream white, loosely appressed scales, irrorated with bronze-brown. Palpi: long, drooping, curved, twice length of head, upper, inner surface of second joint and basal half of third joint same as head, outer and under side the brown predominates, with a few specks of white; apical half of third joint, brown predominates, same as under side. Second joint tufted on under side, outer edge dentate, apical joint half length second, slender, slightly rough beneath, pointed. Antennæ two thirds length of forewing, basal joint slightly larger than next, bronze-brown speckled with white, outer joints alternate rings of bronze-brown and white. Thorax and fore wings bronze-brown, irrorated with white, the basal half of each scale is white, outer and overlapping half bronze-brown, the white irrorations are caused by the brown not entirely covering the basal white. This arrangement of scales is uniformly distributed over the wing, except on the costal margin outer quarter and outer margin, where on account of the greater length of the scales, more white is exposed and the colors are almost equal. On the outer margin the same coloration extends half way out on the cilia. Underside dull brown, with a very faint wave-like whitish irroration, more distinct at apex. Hind-wing: both upper- and underside and cilia fuscous. Abdomen: bronze-brown, irrorated with whitish-brown at incisions on upper side, and over entire under surface, tufts of whitish-brown scales along each side. Legs: same ground color, with small specks of whitish-brown, with an almost white annulation at each incision. Average alar expanse 16 to 19 mm., one specimen only 11 mm.

Fifty-five specimens bred from larvæ forming a peculiar gall on the lateral shoots of *Aster patens* Ait., from Caldwell, N. J., issued during October. Type U. S. Nat. Mus., No. 6818, and Cotypes Am. Mus. Nat. Hist., Acad. Nat. Sci., British Museum and collection Kearfott.

*Larva*. — Cylindrical, robust, tapering only at extreme ends, length 10 mm., width abdominal segments 2 mm., width head .8 mm. Head small, rounded, bilobed, color dark brown, paler on front of lobes, clypeus narrow, evenly triangular, reaching to apex; paraclypeal pieces dark brown; ocelli black, antennæ moderate, basal segment whitish. Prothoracic shield a darker shade of yellow than skin, triangular, bisected by paler dorsal line, anal shield same, very narrow and small, neither chit-

inous. Thoracic feet concolorous, a small triangular brown spot cephalad and ventrad to each. Abdominal feet normal, small crochets of hooks complete, in minute circles. Skin uniformly pale yellow, dorsal line and anal segments smoky yellow, from food visible through clear skin. Spiracles minute, concolorous. Tubercular plates obsolete, tubercles very minute, setæ short and very minute, pale yellow.

*Pupa*.—From empty pupal skin: length 7 to 8 mm., width 1.8 mm. to 2 mm. Shape cylindrical, gradually tapering from thorax to anal segment, emergence affected by a split on dorsal line to and through mesothorax, on ventral surface the separation occurs on outside edge of one eye piece, and almost an even line to base of labial palpi, the latter is separated from adjoining tissue but remains attached at base. Wing cases, antennæ, and metathoracic feet extend down to posterior edge of seventh abdominal segment. Labial palpi to posterior edge of third abdominal segment. Eye-covers very small, clypeus small, narrow triangular at lower edge where it joins labrum. I cannot make out a distinct suture defining maxillary palpi. Anal segment terminates in an obtuse point, no defined cremaster or hooks, both dorsal and ventral surfaces are evenly smooth, free from deep sutures or hooks and setæ are so short as to be invisible under a lens of moderate power.

Late in August, last year, I noticed in a swampy meadow near Caldwell, N. J., a large proportion of the common late purple aster (*Aster patens* Ait.) with their lateral twigs or branches dwarfed in a peculiar manner (Plate IX, Fig. 18, enlarged), and on investigation found each of these twigs to contain a lepidopterous pupa.

This year, I have made almost weekly examinations of the plants, and not until late in July were the larvæ found, apparently nearly full grown as they began pupating the first week in August.

A moth was caught on a warm day late in November, having been beaten up from its resting place close to or almost on the ground.

Another peculiarity in connection with the life-history of this species is that it seems to be partially dependent upon the habits of another insect to prepare its habitat. Each of the Aster plants on which *busckiella* larvæ or pupæ were found in the lateral stems, were tenanted in the main or central stem by a single larva of *Thiodia radiatana* Wlsm., a large Tortricid. This larva makes a long burrow or excavation, three or four inches long, open at the top, destroying the central bud; thus the plant, pruned at the top, immediately starts a vigorous growth of laterals. On some plants as many as a dozen were found, each tenanted by *busckiella*. The Tortricid larva remains in the stem throughout the winter, deserting it late in March or early April and pupates on the ground, in a closely spun brown cocoon among the dried grass, leaves, etc.

The life cycle of *busckiella* then appears to be: Hibernation in the perfect state, eggs laid during June, after *radiatana* has dwarfed the



plant and thereby started many tender lateral twigs, larvæ full grown and pupated early in August and moths emerging during September and early October.

The effect produced by the larva of this species on the aster twig, is to hinder its growth at its outer ends, causing the leaves to be closely crowded together, and closely massed somewhat like a wide-open cone of hemlock or spruce. The stem, for about two inches of its outer length is also swelled to about twice the diameter of the portion of the stem below the gall. There is no opening at all in this cell, during the larval period, but just before pupation a hole large enough for moth to crawl out is cut in the upper portion, but not entirely through. The thin outer skin is left intact to be broken by the moth. So the frass cannot be ejected, and as but a thin dark layer is found in the lower end of the cell, I am inclined to think that the greater part of the excretion is absorbed in the live and growing tissue of the plant.

I have observed the same state of affairs in the large plum-like galls on goldenrod of *Gnorimoschema gallæsolidaginis* Riley. The query arises: Are not the galls produced by the absorption into the cells of the plant, of this unaccustomed liquid rather than by any mechanical action caused by the larva eating? It would not be difficult to learn something more about this, by the use of a hypodermic syringe, to inject the liquid squeezed from a few pellets of frass into the soft tissues of various perennial or other plants.

The moth emerges from pupa within the cell, leaving the empty pupal shell within.

***Gnorimoschema artemisiella*, sp. nov.** Plate IX, Fig. 5.

Head, thorax and palpi grayish-white, irrorated with darker scales, face white. Second joint palpi thickened, outer joint two thirds length of second with a basal and subapical band of brown scales, patagia terra-cotta. Antennæ two thirds length forewing, basal joint mottled, outer joints annulated light gray and black. Forewing ochreous, pink, or terra-cotta, heavily overlaid with streaks and bands of mottled gray and black, running parallel to costa. The costa is narrowly edged with this secondary color, a streak from base along median line curving into costa at one half; this color also predominates along inner margin. On apical third the black and gray dots are formed into narrow streaks or dashes radiating to outer edge and extending over cilia. There are three small black dots of raised scales, one on costa at inner fourth, one in cell just before outer end and one on median line beyond cell. There is a considerable degree in variation in different specimens, some are so heavily overlaid with the secondary color that the ground color is reduced to three narrow streaks, one just below costa, one along median line and the lower one in fold, these only extending to end of cell with just a bare indication of

the ground color on the outer half between the nearly parallel radiating lines of the secondary color. In other specimens the ground color occupies more than half of the inner half and extending down to inner margin. Underside fuscous with secondary color on apical cilia. Hindwings light gray, cilia fuscous, under side same. Abdomen: upper side terra-cotta, but more ochreous than on forewing; anal segment grayish-white, underside pearly white, a double row of black dashes on either side of segments 6 to 9. Legs same color as underside of abdomen, tinged and mottled with brownish black. Alar expanse 9 to 11 mm.

Described from twenty-four specimens bred from *Artemisia Canadensis* Michx., received in June, 1902 and 1903, from my friend Mr. Jos. H. Reading, of Chicago. I also have one specimen of what is no doubt this same species, collected by Dr. R. E. Kunze, July, 1900, Pinal Mountains, Arizona; Mr. Busck advises me that in the U. S. National Museum are specimens of this same species, unnamed, bred by Miss Murtfeldt on *Aster*, from St. Louis; indicating a rather extensive range. Type U. S. Nat. Mus., No. 6816. Cotypes Am. Mus. Nat. Hist., Acad. Nat. Sci., British Museum and collection Kearfott.

*Larva*.—Cylindrical, slender, tapering evenly from 7 to anal segment, annulate. Length 8 mm. Width 1 mm. Head .6 mm. Head small, rounded, slightly bilobed, clypeus evenly triangular, extending nearly to apex. Ocelli black, antennæ minute. Head yellowish-brown, retractile under 2. Prothoracic shield moderate, triangular, mottled brown, bisected by paler dorsal line, and an almost black spot each side of dorsal line on posterior edge. Anal shield pale yellowish-green, small, shining but not chitinous. Thoracic feet clear yellowish-green, tipped with brown; abdominal feet normal, small, circles complete. Skin dull sordid green, not shining. Tubercular plates not developed, tubercles small black raised points, no other marks except discoloration from food showing through dorsal area. Setæ very weak and minute.

*Pupa*.—Length 5 mm., width across thorax 1.5 mm., very slightly flattened. Surface generally smooth, tapering gradually to blunt point end of anal segment, which is armed with a radiating zone of very minute stiff hairs before the apex. Vertex of head and upper part of clypeus full, rounded, and extending up above the eye cases, latter small, round, prominent and well defined. Beneath the eyes, on each side of labrum, is a small raised process consisting of a parallel pair of narrow short elevations, which may indicate the maxillary palpi. Labial palpi broadened out about the middle of its length and terminates just before the prothoracic feet, about one half length of wing cases. Latter with antennæ cover fifth abdominal segment. Dehiscence: Pupal skin is very flimsy and fragile and difficult to rescue without fracture from its cocoon, but there appears to be one long break on each side of labial palpi, this organ remains attached at posterior end, and remains united to labrum and clypeus. The cap on vertex of head and eye covers are entirely separated; antennal cases remain attached to wing covers.

The terminal leaves of this plant resemble a long silvery green

tassel, composed of a thick mass of velvety needle-like leaves. This tassel is webbed together by a small green larva, that partially excavates the tip of the twig and feeds close to the bases of the leaves.

The majority had pupated by the first of July in a tough compact little cocoon well hidden in the mass; the first moth issued July 3 and continued until July 17.

Three different species of hymenopterous parasites were bred from this species, namely, *Iseropus inquisitor* Say, *Temelucha nartii* Ashm., *Protapanteles cacæciæ* Riley.

**Anacampsis coverdalella**, sp. nov. Plate IX, Fig. 13.

Head: closely appressed scales, thorax dark purplish-brown. Palpi same color, slender, long pointed. Antennæ: basal two fifths same color, outer three fifths canary yellow, length four fifths of wing. Front wing: base from costa to inner margin dark purplish-brown, from base to outer fourth canary yellow, outer fourth same as base and thorax—both division lines vertical from costa to inner margin, slightly serrate. The yellow color along costa a shade paler than below median line. Cilia very short, unicolorous with adjacent portion of wing. Underside brownish fuscous shading into darker gray fuscous beyond outer third; a small basal costal patch of nearly black purple brown. Hind wing fuscous, cilia slightly paler and as long as breadth of wing; underside the same. Abdomen: first two abdominal segments canary yellow, others purplish-brown, same as thorax. Underside fuscous. Legs fuscous, tarsi and spurs purplish-brown, nearly black. Alar expanse 11.5 mm.

Specimens collected by George Coverdale, Natchitoches Parish, La., after whom I take pleasure in naming this distinctively marked species. Type U. S. Nat. Mus., No. 6967. Cotype collection Kearfott.

**Epimenia cicutaella**, sp. nov. Plate IX, Figs. 12, 15 and 16.

Head: closely appressed scales, fuscous, each scale tipped with a minute dot of brown—making a finely speckled appearance. Thorax and patagia the same, but the latter a darker fuscous. Labial palpi long, recurved, apical joint about half second, thickened with loose scales, rather obtuse; yellowish fuscous inside, lower edge tipped with dark brown; outside same but much darker, apical joint dark brown, with minute yellowish specks. A narrow ring of yellow on middle joint at outer end. Antennæ about three quarter length forewing, basal joints slightly enlarged, dark brown, outer joints ringed with brown and pale gray. Forewing creamy white, irrorated with brown and black dots. The brown color is massed into a smoky brown shade on and parallel to costa beginning just before half and extending to outer two thirds, the shade is darkest brown along median line, its inner edge extends obliquely to inner margin and is there accentuated by largest dentate pencil of scales referred to below; the lower edge of shade is sharply defined by paler ground color, just below median line, somewhat reniform, with inner lobe twice length of outer. Beyond this in apical third along median line is another smoky brown shade longer than wide, and a very small one just beyond base on median line. At base of wing is

a short median dash of black. The costa is also marked with about eight small clusters of black scales irregularly spaced. The inner margin is strongly dentate by four clusters of long scales, whitish at base and tipped with black; the largest cluster at inner third, the outer three evenly spaced within the middle third; a small black spot between two brown shades, on median line at outer two thirds and another black spot on outer margin just below apex. Cilia pale fuscous, more than the width of wing, on outer margin long wing scales project into cilia forming a smoky line bounded inwardly by ground color and outwardly by pale fuscous and extreme edge beyond that smoky fuscous, at apex the cilia is uniformly dark, forming a hook-like termination to wing. Underside dull fuscous. Hindwing, upper- and underside bright silvery fuscous. Cilia very long, three to four times wings' width. Abdomen and legs fuscous, latter banded with very dark brown. Alar expanse 13 to 14.5 mm.

Forty specimens bred from larvæ on flower heads of *Cicuta maculata* Linn., water hemlock, Essex County, N. J. Type U. S. Nat. Mus., No. 6815. Cotypes Am. Mus. Nat. Hist., Acad. Nat. Sci., British Museum and collection Kearfott.

*Larva*.—Mature 6.5 mm., robust, cylindrical, slightly tapering, width 1 mm. Width head .6 mm. Head very pale brown, clypeus evenly triangular, reaching nearly to vertex; slightly bilobed, lobes full and rounded. Mouth parts dark brown, antennæ moderate, pale green, except outer joint brown. Ocelli on black field. Prothoracic shield, all of dorsal region, bisected by a narrow yellowish line, same color as tubercular plates. Anal shield small, narrow, not chitinous. Thoracic feet black, greenish-yellow at articulations. Abdominal feet normal, hooks very dark brown in complete circles, not open. Skin creamy white, broad subdorsal band of a smoky brown or pale grayish-brown from segment 3 to anal segment, involving tubercles i and ii. These bands are continuous from 5, and on 3 and 4 are interrupted between tubercular plates. The latter on thorax and abdomen are large and same color as subdorsal bands, but a shade darker. Tubercles i and ii normal, iii dorsad and cephalad to spiracle iv + v. On thorax ia + ib, iia + iib, iv + v. Setæ moderate, very dark nearly black. Spiracles small, round, very dark brown.

*Pupa*.—Nearly cylindrical to ends of wing cases, then evenly tapering to apex. Length 5 to 6 mm.; diameter 1 mm. Cremaster long, narrow, armed with about a dozen short hairs, each terminating in a strong recurved hook, all pointing backwards. Vertex of head full, rounded, smooth, and much paler in color than balance of pupa, eye cases small, rounded, labrum small, labial palpi widens to double width of labrum at one third below it, and extends down two thirds length of wing-covers. Antennæ and wing cases cover seventh abdominal segment, organs on frontal piece well defined, sutures deep. A lateral spine on abdominal segments 4 to 7. Color of pupa, except vertex of head, very dark brown, nearly black on dorsum. Dehiscence: A long separation between antennal cases and labial palpi, on each side of latter and extending two thirds their length; labrum and clypeal piece remain attached to labial palpi; half of eye cap attached to wing cover. Antennæ remain cemented to wing covers on lateral edges.

Miss Murtfeldt\* described an *Epimenia* which she bred from

---

\* Can. Ent., XXXII, 162, 1900.

*Pimpinella integerrima* Linn., a plant closely allied to *Cicuta*; I have compared my species with specimens of *Pimpinella* Murtf., in the U. S. National Museum and there is no doubt they are distinct.

The food-habits are also different. My species lives on the flower heads of *Cicuta maculata* Linn., and when the seeds are formed it excavates their contents (Plate IX, Fig. 16, enlarged). In fact the majority of larvæ found are more than half buried in a seed. Although carefully examined a number of times before the seeds formed, I was unable to find any indication on the leaves that the larvæ had at any time mined them. When ready to pupate the larva makes brown silk open-mesh cocoon, invariably spun either on the upper or under side of the seed heads, between the radiating stems on which the seeds are borne.

My species is very similar to but quite distinct from the European *E. chærophylla* Gz.\*

Larvæ mature and begin pupating first week of August. Moths emerge August 18 to 27.

The discovery of this species was rather an accident. An unusual looking insect on the flower head of *Cicuta* caught my eye whilst looking carelessly at the plant; close examination showed it to be a moth just out of the pupa, with wings as tiny pads; it was bottled and allowed to develop and dry and a careful search made for other specimens, which were soon found in considerable numbers, but all on that date, August 20, as pupæ. The larvæ were not turned up until nearly a year later.

One parasite was bred from this species, *Iseropus inquistor* Say.

***Epimения ramapoella*, sp. nov.** Plate IX, Fig. 4.

Head, palpi, thorax, patagia, abdomen and front wings pale creamy brown faintly tinged with red, and irrorated with very minute dots of fuscous. Front wings: Three small black dots along median line, one at inner third, one at half and one at outer third; two small dots of black on costa just before apex. Irregularly dentate along middle third of inner margin, defined by two clusters of longer scales, all tipped with black. At base of wing and along inner margin before anal angle ground color is less creamy brown and more whitish-gray, while on apical third the brown scales are closer together, becoming intensely brown at apex. Cilia shining brown, shading into dark fuscous at apex, length not quite width of wing. Hind wing gray, cilia same as front wing and about twice width of wing. Underside both wings and cilia shining brown. Underside abdomen dark brown, except outer edges each segment light brown. Legs same as general ground color, a shade paler at joints. Alar expanse 14 to 16 mm.

---

\* Meyrich, Handbook Br. Lep., p. 691.

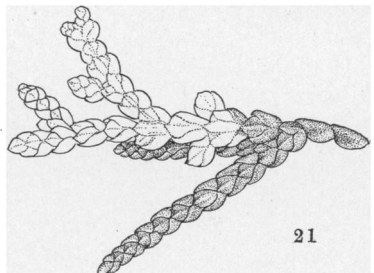
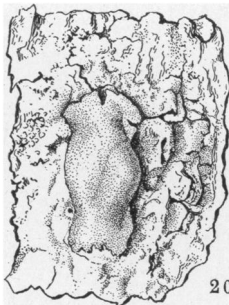
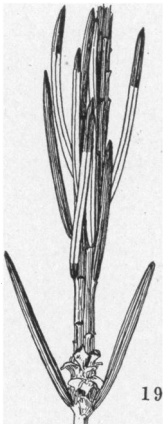
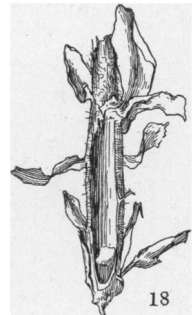
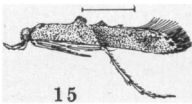
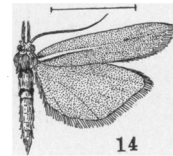
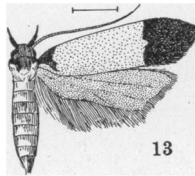
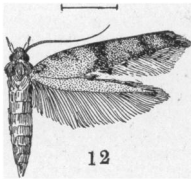
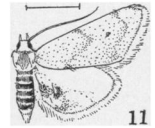
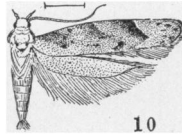
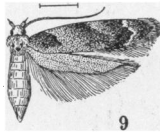
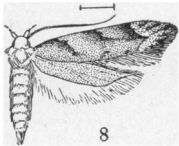
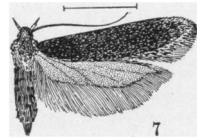
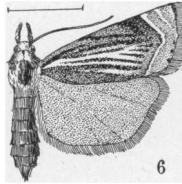
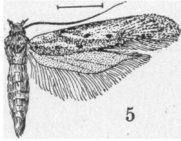
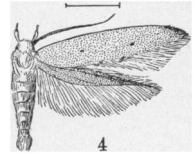
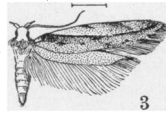
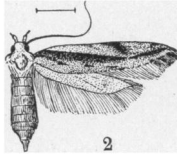
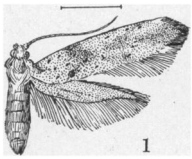
Described from five specimens, all taken at Ramapo, N. Y., May 27, 1900, on a steep mountain side, in dense woods. The moths seemed fairly abundant flying up from the shrubbery as it was disturbed, or from one tree trunk to another. A much larger series could easily have been taken, but on this particular date the woods were almost uninhabitable from the myriads of very small hymenopterous? insects, which gathered in clouds about one's head and required constant slapping of neck, face and hands.

Type U. S. Nat. Mus., No. 6966. Cotypes Am. Mus. Nat. Hist., and collection Kearfott.

MONTCLAIR, N. J.,  
August, 1903.

#### EXPLANATION OF PLATE IX.

- Fig. 1. *Zelleria celastrusella* Kearfott.
- Fig. 2. *Recurvaria obliquistrigella* Chambers.
- Fig. 3. *Recurvaria juniperella* Kearfott.
- Fig. 4. *Epimenia ramapoella* Kearfott.
- Fig. 5. *Gnorimoschema artemisiella* Kearfott.
- Fig. 6. *Crambus vachellellus* Kearfott.
- Fig. 7. *Gnorimoschema busckiella* Kearfott.
- Fig. 8. *Recurvaria thujaella* Kearfott.
- Fig. 9. *Recurvaria piceaella*, var. *nigra* Kearfott.
- Fig. 10. *Recurvaria piceaella* Kearfott.
- Fig. 11. *Symphysa adelalis* Kearfott.
- Fig. 12. *Epimenia cicutaella* Kearfott.
- Fig. 13. *Anacampsis coverdalella* Kearfott.
- Fig. 14. *Thaumatopsis daeckellus* Kearfott.
- Fig. 15. *Epimenia cicutaella* Kearfott, dorsal view.
- Fig. 16. Seed of *Cicuta maculata* Linn., excavated by larva of *Epimenia cicutaella* (enlarged).
- Fig. 17. Mine of *Recurvaria juniperella* (enlarged) on *Juniperus communis* Linn.
- Fig. 18. Section of gall on *Aster patens* Ait., caused by larva of *Gnorimoschema busckiella* (enlarged).
- Fig. 19. Mines of *Recurvaria piceaella*, in needles of *Picea mariana* Mill. (enlarged).
- Fig. 20. Case of *Symphysa adelalis* on lichen (enlarged).
- Fig. 21. Mine of *Recurvaria thujaella* on *Thuja occidentalis* Linn. (enlarged.)



E.L. Beutenmüller

New Tineoidea.